510(k) SUMMARY

MAY 2 4 2012

A. 510(k) Number:
k121232

B. Purpose for Submission:
New Device

C. Measurand:
Ferritin

D. Type of Test:
Quantitative, immuno-turbidimetric

E. Applicant:
Kamiya Biomedical Company

F. Proprietary and Established Names:
K-*ASSAY*® Ferritin (2nd Gen.)
K-*ASSAY*® Ferritin Calibrator (2nd Gen.)

G. Regulatory Information:

1. Regulation section:
   21 CFR §866.5340 Ferritin immunological test system
   21 CFR §862.1150 Calibrator

2. Classification:
   Class II

3. Product code:
   DBF: Ferritin, antigen, antiserum, control
   JIT: Calibrator, secondary

4. Panel:
   Immunology (82)
   Clinical Chemistry (75)

H. Intended Use:

1. Intended use(s):
   K-*ASSAY*® Ferritin (2nd Gen.)
   The K-*ASSAY*® Ferritin (2nd Gen.) assay is an *in vitro* diagnostic reagent for the quantitative determination of ferritin (an iron-storing protein) in human serum and plasma by immunoturbidimetric assay on the Beckman AU680 analyzer. Measurements

of ferritin aid in the diagnosis of diseases affecting iron overload and iron deficiency anemia. For *in vitro* diagnostic use.

K-*ASSAY*® Ferritin Calibrator (2nd Gen.)
The K-*ASSAY*® Ferritin Calibrator (2nd Gen.) is an *in vitro* diagnostic reagent for calibration of the K-*ASSAY*® Ferritin (2nd Gen.) assay. For *in vitro* diagnostic use.

2. Indication(s) for use:
Same as Intended Use.

3. Special conditions for use statement(s):
Prescription use only.

4. Special instrument requirements:
Beckman/Olympus AU680, k961274.

I. Device Description:

The K-*ASSAY*® Ferritin (2nd Gen.) assay is a latex enhanced immuno-turbidimetric assay for the quantitative *in vitro* determination of ferritin levels in serum and plasma (EDTA and heparin) samples.

The K-*ASSAY*® Ferritin (2nd Gen.) consists of two reagents. Reagent 1 contains HEPES buffer solution (50 mmol/L) and Reagent 2 contains HEPES buffer solution (50 mmol/L) and a solution of latex suspension with mouse monoclonal anti-human ferritin antibodies. Both reagents also contain less than 0.01 w/v% of sodium azide as a preservative.

Reagent 1:	Reagent 2:
50 mM HEPES	Latex particles sensitized with mouse monoclonal anti-human ferritin antibody
< 0.01 w/v% Sodium Azide	50 mM HEPES
pH 7.4 ± 0.2	< 0.01 w/v% Sodium Azide
	pH 7.4 ± 0.1

The K-*ASSAY*® Ferritin Calibrators (2nd Gen.) are liquid stable products consisting of a human serum matrix and known quantities of human ferritin at 6 levels ranging from 0 - 1,000 ng/mL (0, 25, 250, 500, 750, 1,000 ng/mL). The calibrators also contain less than 0.1 w/v% of sodium azide as a preservative.

J. Substantial Equivalence Information:

1. Predicate device name(s) and predicate K number(s):
K-*ASSAY*® Ferritin (2) and Ferritin Calibrator set (k050944)

2. Comparison with predicate

Ferritin Reagent

Note predicate reagent, originally registered as K-*ASSAY*® Ferritin (2) under k050944, is currently sold without the "(2)" as the older Ferritin was discontinued in 2007.

SIMILARITIES		
Item	Device	Predicate
Intended Use / Indications for Use	For the quantitative determination of ferritin (an iron-storing protein) in human serum and plasma by immunoturbidimetric assay. Measurements of ferritin aid in the diagnosis of diseases affecting iron overload and iron deficiency anemia. FOR *IN VITRO* DIAGNOSTIC USE.	Same
Measurement	Quantitative	Same
Assay Principle	Latex-enhanced immuno-turbidimetry	Same
Sample Type	Serum, EDTA and heparin plasma	Same
Format	Liquid	Same
Uses Calibration To Determine Ferritin Levels	Yes	Same

DIFFERENCES		
Item	Device	Predicate
Reagents	Reaction buffer and latex particles coated with mouse anti-human ferritin monoclonal antibodies	Reaction buffer and latex particles coated with rabbit anti-human ferritin antibodies
Assay Range	5 - 1,000 ng/mL	2 - 1,000 ng/mL
Calibration	Six-point calibration curve (0, 25, 250, 500, 750, 1000 ng/mL)	Five-point calibration curve (0, 100, 200, 500, 1000 ng/mL)
Instrument	Beckman/Olympus AU680	Roche/Hitachi 917 analyzer.
Expected Values (Serum)	Female: 10 - 200 ng/mL Male: 30 - 300 ng/mL (from the literature)	Female: 2 - 110 ng/mL Male: 7 - 253 ng/mL

Calibrators

SIMILARITIES		
Item	Device	Predicate
Intended Use / Indications for Use	For calibration of the K-*ASSAY*® Ferritin (2nd Gen.) assay. FOR *IN VITRO* DIAGNOSTIC USE.	Same
Matrix	Human Serum	Same
Analyte	Human Ferritin	Same

DIFFERENCES		
Item	Device	Predicate
Traceability / Standardization	WHO 2nd International Ferritin Standard, lot 80/578	WHO 1st International Ferritin Standard, lot 80/602
Levels	6	4 + 1 (Saline Used for 0 ng/mL but not Included)

K. Standard/Guidance Document Referenced (if applicable):

1. CLSI EP05-A2: Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline - Second Edition, 2004.

2. CLSI EP06-A: Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach; Approved Guideline, 2003.

3. CLSI EP17-A: Protocols for Determination of Limits of Detection and Limits of Quantitation; Approved Guideline, 2004.

4. CLSI EP07-A2: Interference Testing in Clinical Chemistry; Approved Guideline - Second Edition, 2005.

5. CLSI EP09-A2-IR: Method Comparison and Bias Estimation Using Patient Samples; Approved Guideline - Second Edition (Interim Revision), 2010.

L. Test Principle:

Human serum or plasma is mixed with a suspension of latex particles coated with purified mouse anti-human ferritin monoclonal antibodies. The resulting immune complexes are measured by turbidimetry. The signal generated is correlated with the concentration of ferritin in the sample. By interpolation on a calibration curve prepared from calibrations of known concentrations, the concentration of ferritin in the sample is calculated. The K-*ASSAY*® Ferritin (2nd Gen.) assay is analyzed using Beckman/Olympus AU680 clinical chemistry analyzer.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision / Reproducibility:

Tests were performed according to the CLSI EP05-A2 guideline on 3 levels of controls and 3 levels of human serum samples, assayed in duplicate twice a day, for 20 days. The results are summarized in the table below:

Sample	Mean (ng/mL)	Within-Run		Between-Run		Between Day		Total	
		S.D.	CV%	S.D.	CV%	S.D.	CV%	S.D.	CV%

Sample 1	58.140	0.792	1.362	0.709	1.219	0.141	0.243	1.072	1.844
Sample 2	95.801	0.821	0.857	0.307	0.321	0.342	0.357	0.941	0.982
Sample 3	979.193	3.341	0.341	5.188	0.530	5.242	0.535	8.097	0.827
Sample 4	10.375	0.463	4.461	0.112	1.083	0.246	2.375	0.536	5.169
Sample 5	22.378	0.535	2.390	0.411	1.838	0.166	0.744	0.695	3.105
Sample 6	254.020	1.866	0.735	1.668	0.657	2.035	0.801	3.226	1.270

50 patient samples ranging from 5.7 - 884.7 ng/mL were tested in duplicate with 3 different lots of reagent. For each sample the mean and the standard deviation for the between-lot component of variance was calculated.

The 50 samples were divided into 4 groups of sizes 12, 13, 12, and 13 samples based on mean values; average CV%'s for the between-lot component for each group were calculated with the following results.

Group	Range of Means Within Group	Average CV%
1	5.7 - 28.0 ng/mL	0.99 %
2	37.3 - 82.0 ng/mL	0.37 %
3	95.7 - 187.3 ng/mL	0.39 %
4	187.5 - 884.7 ng/mL	0.42 %

The CV% for the between-lot precision was less than 1%.

b. *Linearity / assay analytical range:*
Tests were performed according to the CLSI EP06-A guideline on diluted samples. Analyte spiked normal human serum samples were diluted with analyte depleted normal human serum to prepare 11 test concentrations to evaluate total range linearity. Testing was done using 1 reagent lot and all samples were run 4 times.

Calculations were performed according to CLSI EP06-A. The observed concentration (y axis) was compared to the expected concentration (x axis). Linear regression with 95% confidence intervals is below.

Parameter	Estimate	95% CI
Slope	0.9999	0.9976 to 1.0022
Intercept	0.1249	-0.9049 to 1.1546

Nonlinearity was assessed based on CLSI EP06-A guidelines by comparison to a pre-defined goal of 10% deviation. The K-*ASSAY*® Ferritin (2nd Gen.) assay was demonstrated to be linear throughout the claimed measuring range of 5 - 1,000 ng/mL.

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

i. Traceability
The Ferritin values assigned to the calibrators are traceable to the WHO 2nd International Ferritin Standard, lot 80/578.

ii. Stability
The stability of the K-*ASSAY*® Ferritin (2nd Gen.) and calibrator were demonstrated with real-time stability studies. The unopened shelf life is 1 year for both the reagent and calibrators when stored at the recommended temperature of 2-8°C. The open-vial stability is 1 month for both the reagent and calibrator when stored at the recommended temperature of 2-8°C. An on-board stability study confirmed that the reagent is stable for at least 1 month on-board the Beckman/Olympus AU680 analyzer.

d. *Detection limit:*
Limit of Blank (LoB), Limit of Detection (LoD), and Limit of Quantitation (LoQ) for the K-*ASSAY*® Ferritin (2nd Gen.) assay were evaluated using the CLSI EP17-A guideline. Studies were performed on the Beckman/Olympus AU680 analyzer with the following results:

Detection Limits: K-*ASSAY*® Ferritin (2nd Gen.) on Beckman/Olympus AU680		
Limit	**Protocol**	**Claimed Value**
LoB	60 replicates of blank (analyte depleted human serum) were tested in twelve runs per day for 5 days.	1.039 ng/mL
LoD	6 samples diluted to concentrations in the range from LoB to 4xLoB (1.05 - 6.16 ng/mL) were tested in 4 runs per day over 5 days.	1.825 ng/mL
LoQ	10 samples were diluted to concentrations ranging from 1.0 to 10.0 ng/mL and tested in 8 runs per day over 5 days. Acceptable bias: ≤ 2% Acceptable imprecision: %CV≤ 10%	5.0 ng/mL

e. *Analytical specificity:*

i. Endogenous Interference:
Studies were performed according to CLSI EP07-A2. Two serum samples containing ferritin at concentrations of approximately 82 ng/mL and 445 ng/mL were evaluated with the K-*ASSAY*® Ferritin (2nd Gen.) assay on the Beckman/Olympus AU680 analyzer for the effect of interferences. The following substances demonstrated no significant interference based on acceptance criteria: ± 10% deviation of the control value:

Substance	No Interference up to
Bilirubin C	20 mg/dL
Bilirubin F	20 mg/dL
Hemoglobin	500 mg/dL
Rheumatoid Factor	1,000 IU/mL
Sodium Citrate	1,000 mg/dL
Sodium EDTA	500 mg/dL
Sodium Fluoride	1,000 mg/dL
Sodium Heparin	20 mg/dL
Turbidity	2,000 FTU

ii. Antigen Excess (Prozone):
Analyte spiked normal human serum (~80,000 ng/mL) was diluted to obtain a set of 9 concentrations. Up to 80,000 ng/mL, the measured value does not decrease to less than 1,000 ng/mL (the upper limit of assay linearity)

f. Assay cut-off:
See expected values/reference range.

2. Comparison studies:

a. Method comparison with predicate device:
A total of 54 unaltered human serum samples containing ferritin concentrations ranging from 5.9 to 994.4 ng/mL were tested with the K-*ASSAY*® Ferritin (2nd Gen.) assay and the predicate device on the Beckman/Olympus AU680 analyzer according to CLSI E0P9-A2-IR guidelines. Regression analysis resulted in the following data:

Regression Equation
y = 1.0057x + 0.0968
Slope 95% Confidence Interval: 1.0022 to 1.0092
Y-Intercept 95% Confidence Interval: -1.1690 to 1.3625

b. Matrix comparison:

i. Serum Vs. EDTA Plasma
65 matched serum and EDTA plasma patient samples were collected. One sample was spiked to help cover the measuring range. Regression analysis results in the following data:

Regression Equation
y = 1.0199x - 0.0813
Slope 95% Confidence Interval: 1.0105 to 1.0294
Y-Intercept 95% Confidence Interval: -4.1542 to 3.9916

ii. Serum Vs. Heparin Plasma

59 matched serum and heparin plasma patient samples were collected. To cover the entire measuring range, 14 samples were spiked. Regression analysis results in the following data:

Regression Equation
y = 0.9825x + 1.3632
Slope 95% Confidence Interval: 0.9711 to 0.9939
Y-Intercept 95% Confidence Interval: -2.8804 to 5.6067

Serum, EDTA plasma, and heparin plasma are shown to be acceptable assay specimens.

3. Clinical studies:

a. Clinical Sensitivity:
Not applicable.

b. Clinical specificity:
Not applicable.

4. Clinical cut-off
See Expected values/Reference range.

5. Expected values / Reference range:
The package inert provides the reference range from literature:
Female: 10 - 200 ng/mL (serum)
Male: 30 - 300 ng/mL (serum)

Each laboratory is recommended to establish its own reference range.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Silver Spring, MD 20993

Kamiya Biochemical Company
C/O Mr. Shawn Kaplan
12779 Gateway Drive
Seattle, Washington, 98168

MAY 24 2012

Re: k121232
Trade/Device Name: K-Assay® Ferritin Reagent, K-Assay® Ferritin Calibrator
Regulation Number: 21 CFR 866.5340
Regulation Name: Ferritin Immunological Test System
Regulatory Class: Class II
Product Code: DBF, JIT
Dated: April 19, 2012
Received: April 24, 2012

Dear Mr. Kaplan:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into class II (Special Controls), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820). This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed

predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Parts 801 and 809), please contact the Office of *In Vitro* Diagnostic Device Evaluation and Safety at (301) 796-5450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

for Maria M. Chan, Ph. D.
Director
Division of Immunology and Hematology Devices
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and Radiological Health

Enclosure

KAMIYA BIOMEDICAL COMPANY

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INDICATIONS FOR USE STATEMENT

510(k) Number (if known): k121232

Device Name: Ferritin Assay

Indications For Use:

The ***K-ASSAY*** ® Ferritin (2nd Gen.) assay is an *in vitro* diagnostic reagent for the quantitative determination of ferritin (an iron-storing protein) in human serum and plasma by immunoturbidimetric assay on the Beckman AU680. Measurements of ferritin aid in the diagnosis of diseases affecting iron overload and iron deficiency anemia. FOR *IN VITRO* DIAGNOSTIC USE.

The ***K-ASSAY*** ® Ferritin Calibrator (2nd Gen.) is an *in vitro* diagnostic reagent for calibration of the ***K-ASSAY*** ® Ferritin (2nd Gen.) assay. FOR *IN VITRO* DIAGNOSTIC USE.

Prescription Use √ (Part 21 CFR 801 Subpart D) AND/OR Over-The-Counter Use _____ (21 CFR 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE – CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Division Sign-Off
Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) K121232